

Listing of Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (canceled)

2. (currently amended) The material processing system as claimed in claim **[[1]]** ~~24~~, wherein the first ~~test RF~~ signal and a second ~~test RF~~ signal are at different frequencies.

3. (currently amended) The material processing system as claimed in claim **[[1]]** ~~24~~, wherein the first ~~test RF~~ signal and a second ~~test RF~~ signal are at the same frequency.

Claim 4 (canceled)

5. (currently amended) The material processing system as claimed in claim **[[1]]** ~~24~~, further comprising:

an RF bias source configured to provide an RF bias signal; and
an RF subsystem coupled to the process chamber, coupled to the RF bias source and coupled to the test signal source, wherein the RF subsystem comprises means for combining the first test signal, the second test signal, and the RF bias signal and means for providing the first test signal, the second test signal, and the RF bias signal to the process chamber.

6. (currently amended) The material processing system as claimed in claim **[[1]]** ~~5~~, wherein the RF bias signal is used to generate plasma and the first ~~test RF~~ signal and the second ~~test RF~~ signal are not harmonically related to the frequency of the RF bias signal.

7. (currently amended) The material processing system as claimed in claim ~~[[1]]~~ 24, wherein the filter/detector comprises an antenna coupled to the process chamber, a filter coupled to the antenna, and detector coupled to the filter, wherein the filter comprises a bandpass filter (BPF) configured to pass at least one intermodulation product of the first ~~test-RE~~ signal and the second ~~test-RE~~ signal.

8. (currently amended) The material processing system as claimed in claim 7, wherein the at least one intermodulation product of the first ~~test-RE~~ signal and the second ~~test-RE~~ signal comprises an odd-order product.

9. (currently amended) The material processing system as claimed in claim 8, wherein the at least one intermodulation product of the first ~~test-RE~~ signal and the second ~~test-RE~~ signal comprises a fifth order product.

10. (currently amended) The material processing system as claimed in claim 8, wherein the at least one intermodulation product of the first ~~test-RE~~ signal and the second ~~test-RE~~ signal comprises a seventh order product.

11. (currently amended) The material processing system as claimed in claim ~~[[1]]~~ Z, wherein the filter/detector further comprises a power source coupled to at least one of the antenna, filter, and detector.

12. (original) The material processing system as claimed in claim 11, wherein the power source comprises at least one of an RF-to-DC converter configured to convert energy emitted from a process related signal into a DC signal, an RF-to-DC converter configured to convert a non-process related signal into a DC signal, a DC-to-DC converter, and a battery.

13. (currently amended) The material processing system as claimed in claim ~~[[1]]~~ Z, wherein the filter/detector further comprises a controller coupled to at least one of the antenna, filter, and detector.

14. (original) The material processing system as claimed in claim 13, wherein the controller comprises at least one of a microprocessor, a microcontroller, a timer, digital signal processor (DSP), memory, receiver, A/D converter, and D/A converter

15. (currently amended) ~~A material processing system comprising:
a processing tool, wherein the processing tool includes at least one process chamber;
a test signal source coupled to the process chamber, the test signal source providing a first test signal and a second test signal;
a filter/detector for detecting an intermodulation product of the first test signal and the second test signal; and
a controller coupled to the filter/detector and the processing tool, the controller comprising means for determining when a plasma is created using the detected intermodulation product;~~

The material processing system as claimed in claim 24, wherein:

the test signal source further ~~comprises~~ comprising:

- a first source providing a first signal at least one frequency;
- a second source providing a second signal at least one frequency;
- a summing circuit for combining the first signal and the second signal;
- an isolation amplifier coupled to the summing circuit for amplifying the first signal and the second signal; and
- an antenna coupled to the isolation amplifier for transmitting the first signal and the second signal into the process chamber.

16. (original) The material processing system as claimed in claim 15, wherein the first source and the second source comprise sine wave oscillators.

17. (currently amended) The material processing system as claimed in claim ~~[[1]]~~ 7, wherein the ~~test RF energy source~~ ~~signal~~-source further comprises a power source coupled to at least one of the antenna, filter, and detector.

18. (original) The material processing system as claimed in claim 17, wherein the power source comprises at least one of an RF-to-DC converter configured to convert energy emitted from a process related signal into a DC signal, an RF-to-DC converter configured to convert a non-process related signal into a DC signal, a DC-to-DC converter, and a battery.

19. (currently amended) The material processing system as claimed in claim ~~[[1]]~~ 7, wherein the ~~test signal~~ ~~RF energy~~ source further comprises a controller coupled to at least one of the antenna, filter, and detector.

20. (original) The material processing system as claimed in claim 19, wherein the controller comprises at least one of a microprocessor, a microcontroller, a timer, digital signal processor (DSP), memory, receiver, A/D converter, and D/A converter

Claims 21-23 (canceled)

24. (New) A material processing system comprising:
a processing tool having at least one process chamber;
at least one RF energy source coupled to the process chamber, the source
providing a first RF signal and a second RF signal in the process chamber, which
signals will produce an intermodulation product if and when plasma is present in the
process chamber;
a filter/detector for detecting an intermodulation product of the first RF signal and
the second RF signal in the process chamber; and
a controller coupled to the filter/detector and the processing tool, the controller
comprising means for determining that a plasma is present in the chamber in response

to detection of an intermodulation product and for determining that a plasma is absent from the chamber in absence of the detection of an intermodulation product, and for controlling the processing tool in response to the determinations.

25. (New) The material processing system as claimed in claim 24, wherein the RF energy source includes a first signal source for providing the first RF signal, a second signal source for providing the second RF signal, a summing circuit for combining the first RF signal and the second RF signal, an isolation amplifier for amplifying the first RF signal and the second RF signal, and an antenna coupled to the process chamber for transmitting the first RF signal and the second RF signal to the process chamber.